

# Coiltronics MPI2520

## High Current, Low Profile, Miniature Power Inductors



### Applications:

- Mobile/smart phones
- Handheld/mobile equipment
- Digital cameras
- Media players
- GPS
- MP3 Players
- Tablets/e-readers

### Environmental data:

- Storage temperature range (Component): -40°C to +125°C
- Operating temperature range: -40°C to +125°C (ambient + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant

### Packaging:

- Supplied in tape and reel packaging, 3000 parts per 7" diameter reel

### Product description:

- Halogen free, lead free, RoHS compliant
- 125°C maximum total temperature operation
- 2.7 x 2.2 x 1.0 / 1.2mm maximum surface mount package
- Magnetically shielded, low EMI
- Inductance range from 0.47µH to 10.0µH
- Current range from 1.1 to 4.8 amps



The Coiltronics brand of magnetics (formerly of the Bussmann Division of Cooper Industries) is now part of Eaton's Electrical Group, Electronics Division.

**Coiltronics is now part of Eaton**  
**Same great products plus even more.**



Powering Business Worldwide

## Product specifications

| Part Number <sup>5</sup> | OCL1<br>( $\mu$ H) $\pm$ 20% | $I_{rms}^2$<br>(Amps) | $I_{sat}^3$<br>(Amps) | DCR (m $\Omega$ ) @<br>25°C typical | DCR (m $\Omega$ ) @<br>25°C max | K-Factor <sup>4</sup> |
|--------------------------|------------------------------|-----------------------|-----------------------|-------------------------------------|---------------------------------|-----------------------|
| R0 — 1.0mm Height        |                              |                       |                       |                                     |                                 |                       |
| MPI2520R0-R47-R          | 0.47                         | 4.1                   | 4.4                   | 28                                  | 34                              | 2887                  |
| MPI2520R0-1R0-R          | 0.9                          | 3.2                   | 3.2                   | 50                                  | 60                              | 1925                  |
| MPI2520R0-1R5-R          | 1.5                          | 2.4                   | 2.6                   | 80                                  | 96                              | 1444                  |
| MPI2520R0-2R2-R          | 2.2                          | 2.2                   | 2.4                   | 103                                 | 124                             | 1283                  |
| MPI2520R0-3R3-R          | 3.3                          | 1.6                   | 1.6                   | 190                                 | 228                             | 1050                  |
| MPI2520R0-4R7-R          | 4.7                          | 1.4                   | 1.4                   | 240                                 | 288                             | 825                   |
| R1 - 1.2mm Height        |                              |                       |                       |                                     |                                 |                       |
| MPI2520R1-R47-R          | 0.47                         | 4.5                   | 4.8                   | 20                                  | 24                              | 2310                  |
| MPI2520R1-1R0-R          | 1.0                          | 3.7                   | 4.0                   | 35                                  | 42                              | 1925                  |
| MPI2520R1-1R5-R          | 1.5                          | 2.9                   | 3.4                   | 55                                  | 66                              | 1444                  |
| MPI2520R1-2R2-R          | 2.2                          | 2.3                   | 2.7                   | 75                                  | 90                              | 1255                  |
| MPI2520R1-3R3-R          | 3.3                          | 1.8                   | 2.4                   | 105                                 | 126                             | 962                   |
| MPI2520R1-4R7-R          | 4.7                          | 1.6                   | 1.9                   | 150                                 | 180                             | 825                   |
| MPI2520R1-5R6-R          | 5.6                          | 1.5                   | 1.5                   | 200                                 | 240                             | 679                   |
| MPI2520R1-6R8-R          | 6.8                          | 1.3                   | 1.3                   | 300                                 | 360                             | 679                   |
| MPI2520R1-100-R          | 10.0                         | 1.1                   | 1.2                   | 390                                 | 468                             | 525                   |

1. Open Circuit Inductance (OCL) Test Parameters: 1MHz, 0.1Vrms, 0.0Adc, 25°C

2.  $I_{rms}$ : DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125°C under worst case operating conditions verified in the end application.

3.  $I_{sat}$ : Peak current for approximately 30% rolloff at +25°C

4. K-factor: Used to determine  $B_{pp}$  for core loss (see graph).

$B_{pp} = K * L * \Delta I$ ;  $B_{pp}$ : (Gauss),  $K$ : (K-factor from table),

$L$ : (Inductance in  $\mu$ H),  $\Delta I$  (Peak to peak ripple current in Amps).

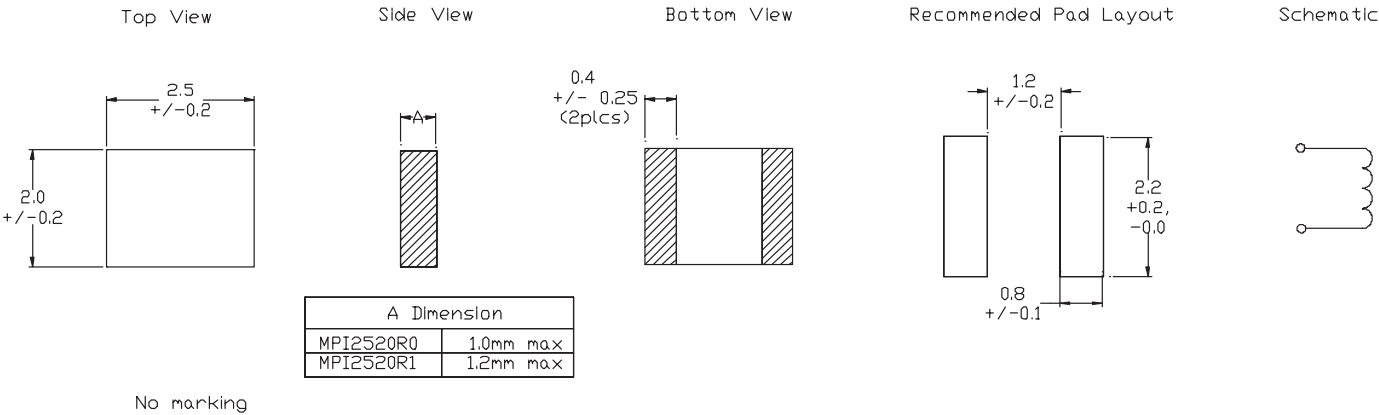
5. Part Number Definition: MPI2520Rx-yyy-R

- MPI2520Rx = Product code and size

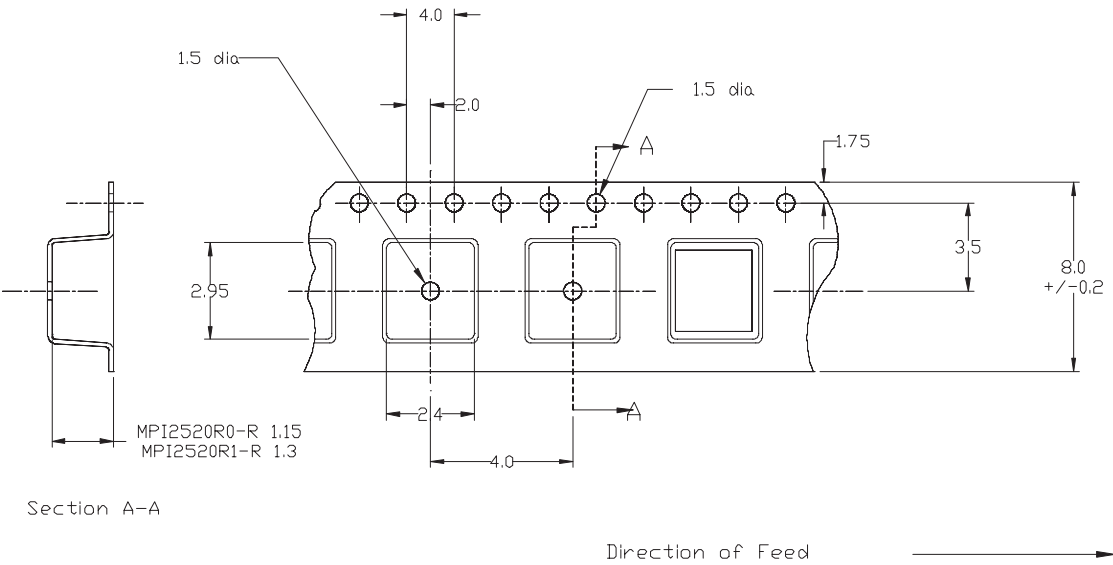
- yyy = Inductance value in  $\mu$ H, R = decimal point, if no R is present then third character = number of zeros.

- "-R" suffix = RoHS compliant

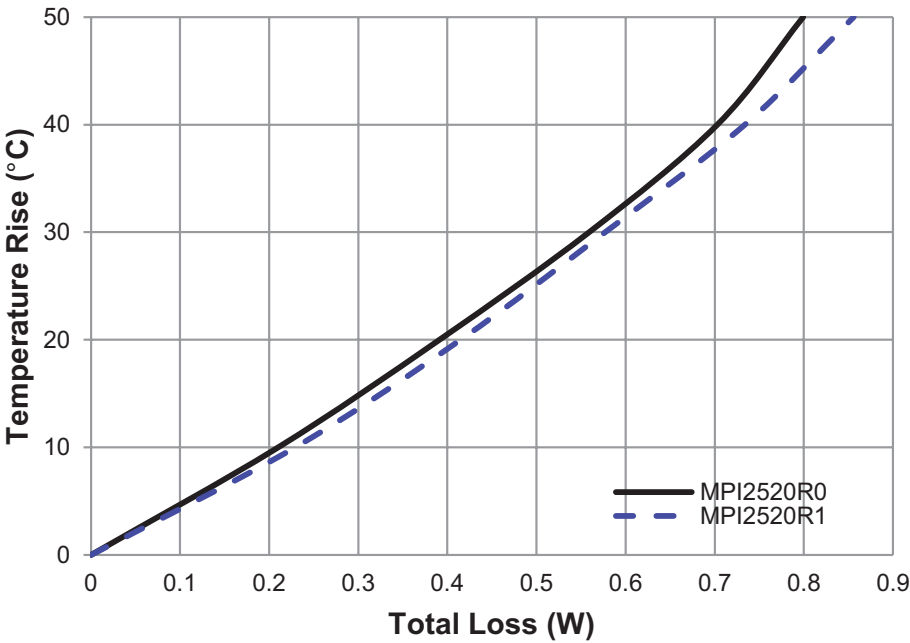
Dimensions - mm



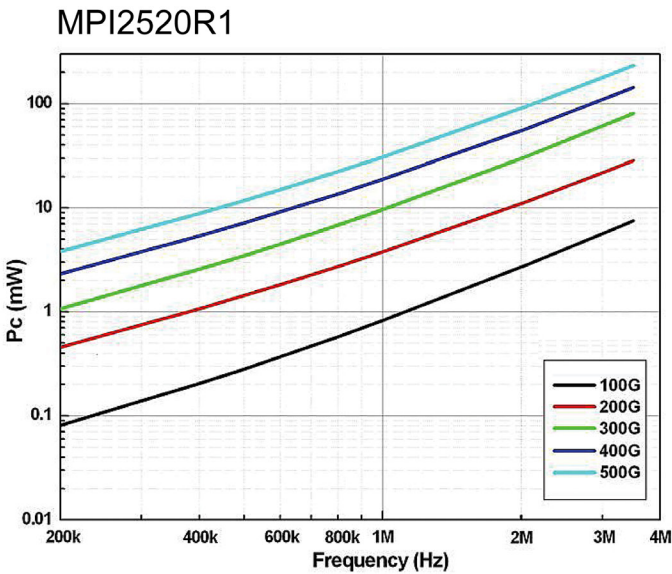
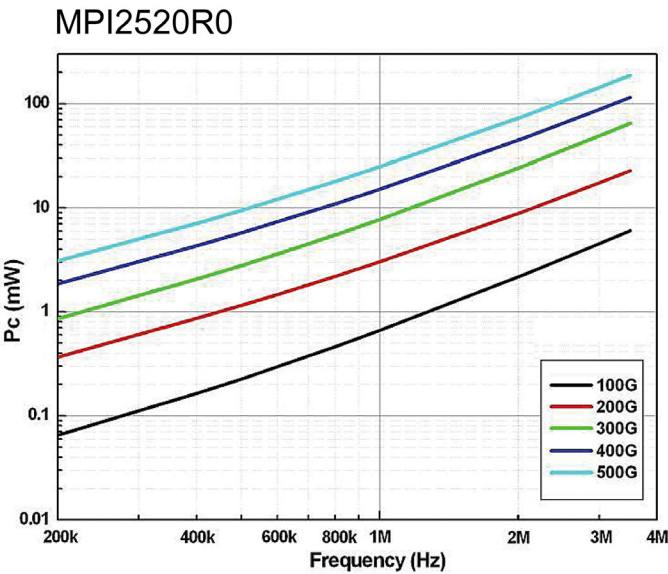
Packaging information - mm



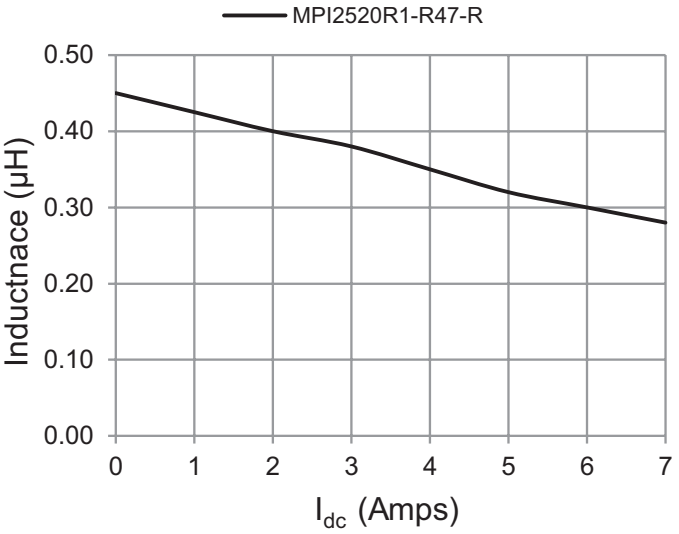
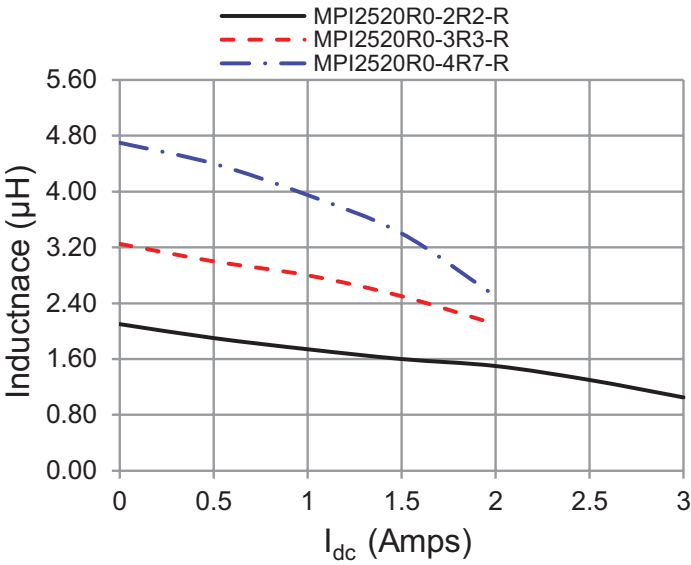
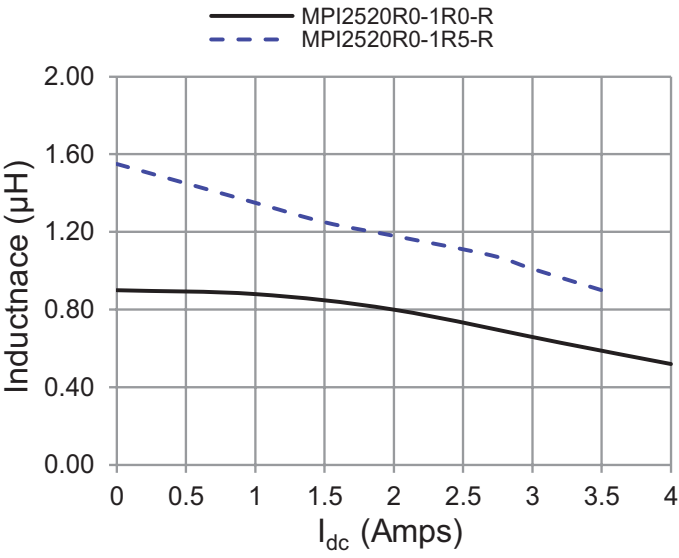
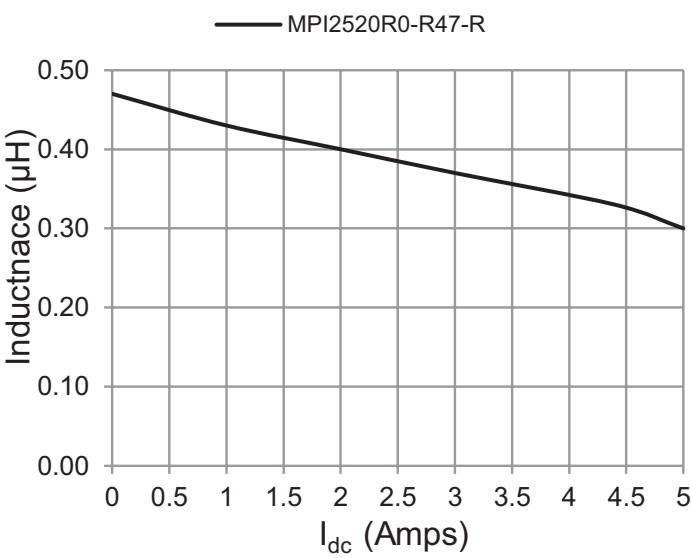
Temperature rise vs. total loss



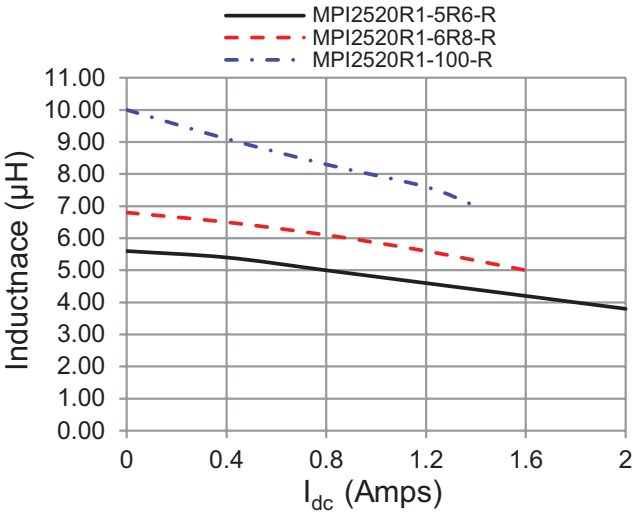
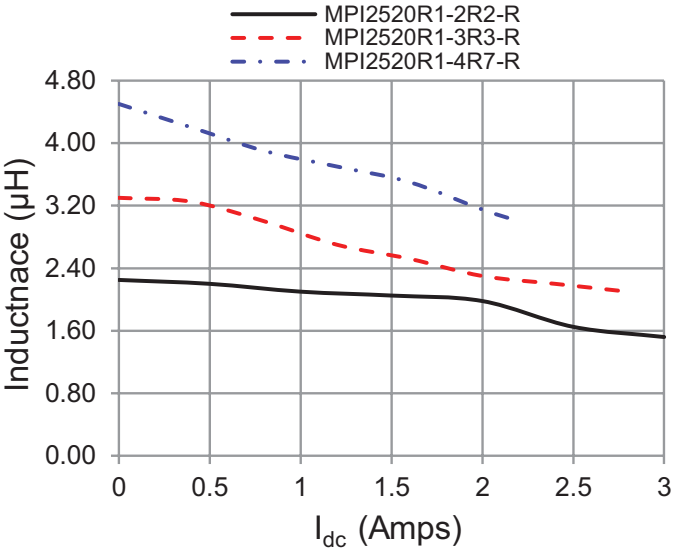
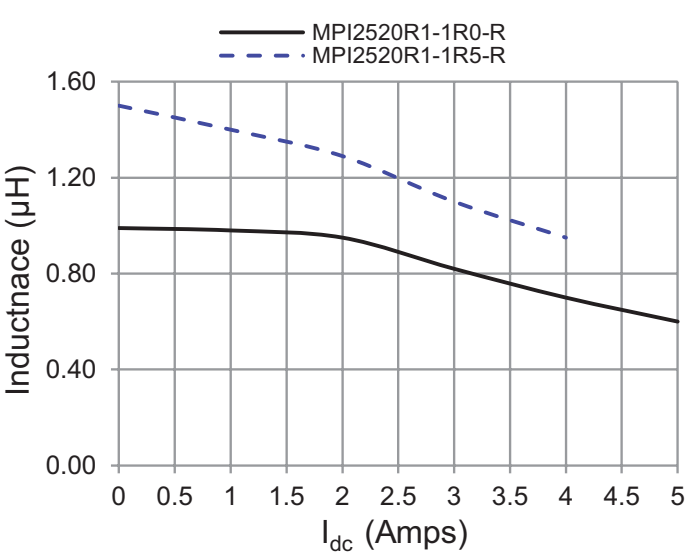
Core loss



Inductance characteristics



Inductance characteristics



## Solder reflow profile

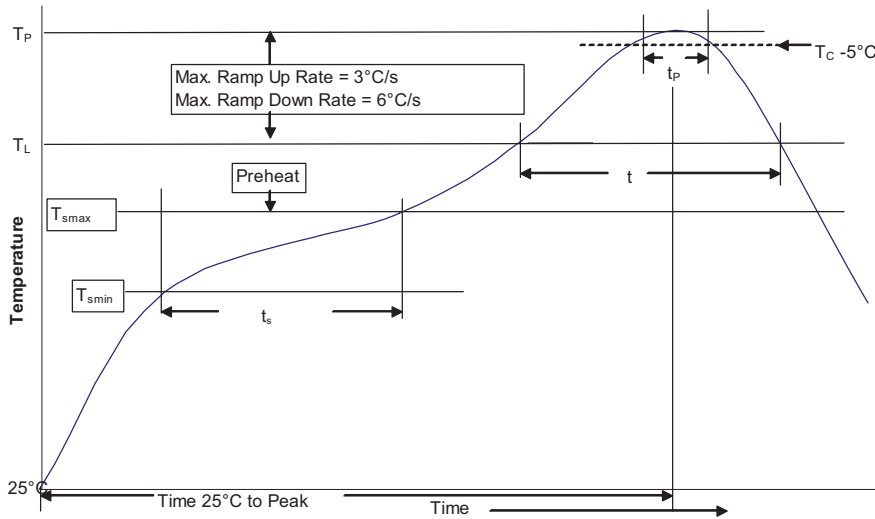


Table 1 - Standard SnPb Solder ( $T_C$ )

| Package Thickness | Volume $\leq 350$ mm <sup>3</sup> | Volume $\geq 350$ mm <sup>3</sup> |
|-------------------|-----------------------------------|-----------------------------------|
| <2.5mm            | 235°C                             | 220°C                             |
| $\geq 2.5$ mm     | 220°C                             | 220°C                             |

Table 2 - Lead (Pb) Free Solder ( $T_C$ )

| Package Thickness | Volume $\leq 350$ mm <sup>3</sup> | Volume 350 - 2000 mm <sup>3</sup> | Volume $> 2000$ mm <sup>3</sup> |
|-------------------|-----------------------------------|-----------------------------------|---------------------------------|
| <1.6mm            | 260°C                             | 260°C                             | 260°C                           |
| 1.6 – 2.5mm       | 260°C                             | 250°C                             | 245°C                           |
| $> 2.5$ mm        | 250°C                             | 245°C                             | 245°C                           |

## Reference JEDEC J-STD-020D

| Profile Feature  | Standard SnPb Solder | Lead (Pb) Free Solder |
|--|----------------------|-----------------------|
| Preheat and Soak   |                      |                       |
| • Temperature min. ( $T_{smin}$ )  | 100°C                | 150°C                 |
| • Temperature max. ( $T_{smax}$ )  | 150°C                | 200°C                 |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                      | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate $T_{smax}$ to $T_p$   | 3°C/ Second Max.     | 3°C/ Second Max.      |
| Liquidous temperature ( $T_L$ )  | 183°C                | 217°C                 |
| Time at liquidous ( $t_L$ )  | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature ( $T_p$ )*   | Table 1              | Table 2               |
| Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_C$ ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate ( $T_p$ to $T_{smax}$ )                                     | 6°C/ Second Max.     | 6°C/ Second Max.      |
| Time 25°C to Peak Temperature  | 6 Minutes Max.       | 8 Minutes Max.        |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

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